5. DETAILED GUIDANCE.

5.1 ADMINISTRATION. Nuclear criticality safety is administered at contractor installations by assigning responsibilities for key nuclear criticality safety requirements and activities. The following position titles and organizations are identified for the purpose of describing key position responsibilities in the administration of a nuclear criticality safety program at an installation.

5.1.1 Contractor President/Chief Executive Officer. The Contractor Installation(s) Corporation/Company President (CEO), through Installation Manager(s), accepts responsibility for, and ensures the administration of, the installation(s) nuclear criticality safety program by addressing the following program elements:

5.1.1.1 Responsibility. Accept overall responsibility for the nuclear criticality safety of operations at the fissionable material nonreactor nuclear facility installation(s).

5.1.1.2 Policy. Establish the corporation/company-level policy for implementing the nuclear criticality safety requirements of this standard and make it known to all contractor employees involved in operations with fissionable material through written company policies.

5.1.1.3 Organization. Establish the corporation/company-level organizations necessary (1) to ensure that supervision is made as responsible for nuclear criticality safety as for production, development, research, or other functions, and (2) to ensure that a Criticality Safety Organization (CSO), staffed with personnel skilled in the interpretation of data pertinent to nuclear criticality and familiar with operations, serves as advisors to supervision. The CSO, to the extent practicable, should be administratively independent of process supervision and be assigned in a manner compatible with that for other safety disciplines.

5.1.1.4 Delegation of authority and assignment of responsibilities. Delegate the authority and assign the responsibility for the day-to-day nuclear criticality safety of operations at an installation to lower level management. In this regard, the President should ensure that the performance of managers is reviewed on a periodic basis with respect to nuclear criticality safety (noting nuclear criticality safety related occurrences, limit-violations, commendable practices, and others), assigning importance to nuclear criticality safety commensurate with the other aspects of management.

5.1.1.5 Oversight committee(s). Establish corporation/company installation committee(s) whose purpose is to monitor the installation nuclear criticality safety program. An Installation Nuclear Criticality Safety Review Committee (INCSRC) should be established at each nonreactor nuclear facility installation. The INCSRC should be responsible for fostering and monitoring nuclear criticality safety across an installation to include, in accordance with the reference in 2.1.17, the annual self-assessment or auditing of

(a) the nonreactor nuclear installation nuclear criticality safety program,

(b) each nonreactor nuclear facility nuclear criticality safety program,

(c) each installation nuclear criticality accident emergency preparedness program including the nuclear criticality accident alarm systems (CASs) and the nuclear criticality accident detection systems (CDSs) for compliance with detection criteria (sections 5.4.1 and

5.4.2), standardization of CASs and CDSs designs across the installation, and configuration control of the systems.

5.1.1.6 Installation triennial review committee. Appoint and convene installation triennial review committee(s) to review and evaluate the effectiveness and adequacy of the internal review system for nuclear facility safety as it pertains to installation(s) nuclear criticality safety.

5.1.1.7 Corrective actions. Ensure that corrective actions resulting from the triennial review process are initiated.

5.1.1.8 Resources. Ensure that the installation(s) has adequate resources to maintain an effective NCS program that includes personnel skilled in the interpretation of data pertinent to NCS and familiar with operations to serve as advisors to supervision.

5.1.1.9 Stop Work Policy. Provide corporation/company policy and assignment of "stop work" authority to relevant personnel within nonreactor nuclear facility installation staffs.

5.1.2 Facility Operations Managers. Facility Operations Managers, whose facilities warrant nuclear criticality safety consideration and controls, should accept responsibility for the day-to-day nuclear criticality safety of their facility by addressing the following elements:

5.1.2.1 CAS Management. Accept responsibility for, and ensure the administration of, a program for CAS management, including CAS availability and alarm circuit functioning within established limits; maintain a current copy of the CAS location analysis in facility files; and request additional CAS analysis as required by facility and process changes.

5.1.2.2 Procedures development and maintenance. Accept responsibility for preparation and maintenance of procedures (including special procedures as necessary) for facility operation that identify nuclear criticality safety steps/controls and drawings identifying equipment important to criticality safety, and ensure the use of, and adherence to, such procedures in day-to-day operations.

5.1.2.3 Staff training. Maintain a program of staff training in both the general and facility-specific aspects of criticality safety.

5.1.2.4 Design and procedure reviews. Provide appropriately trained staff to determine when procedures (including special procedures), drawings, and design documents require nuclear criticality safety review, and ensure that such procedures, drawings, and design documents are forwarded to the CSO for review.

5.1.2.5 Configuration control program. Provide that facility process and equipment configuration control programs that ensure proper nuclear criticality safety review, analyses, approval, and documentation occur prior to implementing or modifying any fissionable material operation within the facility.

5.1.2.6 Self-assessments. Ensure that facility self-audits are performed on a periodic basis, and forward copies of such audit reports to their organization, the CSO, and the Installation Nuclear Criticality Safety Review Committee (INCSRC).

5.1.2.7 Compliance. Accept responsibility for compliance with applicable DOE Orders, Technical Safety Requirements or Operating Safety Requirements, Technical Standards, and Nuclear Criticality Safety Approvals. Compliance should be documented by the self-audit process, CSO operational reviews, INCSRC reviews, and other appraisal processes.

5.1.2.8 Audit response approval. Personally approve the response to NCS review, audit, and appraisal findings.

5.1.2.9 Safety documentation. Ensure that nuclear criticality safety aspects of facility design, construction, and operation are covered by a documented safety analyses.

5.1.2.10 Contingency analysis documentation. Ensure that the facility is covered by documented double-contingency analyses. These analyses,may be incorporated into the safety analysis report.

5.1.2.11 Facility shutdowns. Accept responsibility for the safe shutdown of their facilities where warranted by actual or indicated criticality safety deficiencies.

5.1.2.12 Maintenance of NCS controls. Ensure that passive engineered, active engineered, and administrative nuclear criticality safety means of control are in place and functioning satisfactorily.

5.1.2.13 Fire safety plans. Accept responsibility for the development of a facility fire safety plan that recognizes, to the extent necessary, both fire safety and nuclear criticality safety considerations as specified in DOE Order 6430.1A. These considerations should address the possible use of water or other moderator/reflector influences, the possibility of affecting the accumulation of fissionable material, and the required presence of fire fighters in the fissionable material operations area.

5.1.2.14 Operational postings. Establish and maintain nuclear criticality safety posting for the facility and labeling of fissionable materials.

5.1.2.15 Delegation of responsibilities. Delegate nuclear criticality safety responsibilities to lower level facility supervision; however, overall responsibility for facility nuclear criticality safety remains with the facility manager.

5.1.2.16 Development of criticality accident evacuation routes. Ensure that criticality accident evacuation routes provide for timely facility evacuation, that facility changes do not unnecessarily impede or otherwise lengthen evacuation time, and that, to the extent possible, routes do not require personnel to approach potential sites of a criticality accident.

5.1.2.17 Monitoring for process accumulations. Provide monitoring or surveillance, or both, to forewarn of unacceptable or unsafe accumulations of a significant quantity of fissionable materials in process equipment, storage areas, piping, and ventilation systems, thus permitting normal corrective actions. If unacceptable or unsafe accumulations of a significant quantity of fissionable materials are detected, corrective actions should be taken in conjunction with the area Criticality Safety Organization.

5.1.2.18 Facility access and other NCS controls. Provide other nuclear criticality safety features and administration as necessary to provide for the nuclear criticality safety of the facility, including

personnel training, familiarization, and qualification for nonreactor nuclear facility access control of both assigned and incidental personnel.

5.1.3 Line/Production Management. Line/production management accepts the direct responsibility for, and exercises authority over, the application of nuclear criticality safety to their operations by addressing the following program elements:

5.1.3.1 Acceptance of authority and responsibility. Accept the authority and responsibility for nuclear criticality safety for facility operations under their control to include the implementation of nuclear criticality safety responsibilities as delegated by the contractor President.

5.1.3.2 Standards compliance. Ensure that applicable nuclear criticality safety standards and DOE requirements are applied in the design, modification, and operation of facilities under their control. Means to ensure that this requirement is met potentially include the use of configuration control boards, design reviews, technical reviews, operational readiness reviews, self-assessments/audits, and training, as applicable. Auditable means for demonstrating such compliance should be provided.

5.1.3.3 Operational approvals. Ensure that all operations within the facility are approved by Line/Production Management based upon current nuclear criticality safety analyses and approvals as provided by the Criticality Safety Organization.

5.1.3.4 Staffing and training. Ensure adequacy of staffing and that personnel assigned to work in the facility are adequately trained in specific job tasks and qualified in the procedures for working safely with fissionable materials in accordance with the reference document in section 2.3.1.12.

5.1.3.5 Configuration control. Establish and conduct a configuration control program to ensure that facility modifications to the structure, utilities, operations, or equipment therein that may affect nuclear criticality safety are approved.

5.1.3.6 Procedures. Conduct the testing, start up, operation, emergency control, and corrective/preventive maintenance of the facility in accordance with approved procedures.

5.1.3.7 Maintenance. Ensure that sampling, measurement and control instrumentation, and safety monitoring capabilities are provided and maintained operational.

5.1.3.8 Self-audit. Report, investigate, and document unplanned events and unusual occurrences in accordance with DOE Order 5000.3B.

5.1.3.9 Emergency planning. Participate in, and concur with, planning for emergency response to fires and criticality accidents.

5.1.3.10 Documentation. Ensure that applicable nuclear criticality safety files are maintained for

- operational and equipment approvals,
- technical specifications,
- auditable records of modifications,
- operating reviews,
- procedure reviews,

- maintenance,
- internal audit program, and
- internal training.

5.1.3.11 Notifications. Notify the Criticality Safety Organization if any building or process modifications are planned that could interfere with the performance of the criticality accident alarm system, could require a change in the location of a detector, could require any additions to the criticality accident alarm system, or could otherwise affect the system.

5.1.3.12 Review requests. Bring matters requiring INCSRC review to the attention of the Committee, and solicit the Committee's guidance regarding cases where the need for Committee review is uncertain.

5.1.3.13 Delegation of authority and assignment of responsibilities. Delegate the authority and assign the responsibility for the day-to-day nuclear criticality safety of operations at an installation to First Line Supervision. In this regard, Line/Production Management should review the performance of First Line Supervision with respect to nuclear criticality safety on an annual basis (noting nuclear criticality safety related occurrences, limit violations, commendable practices, and others), assigning importance to nuclear criticality safety commensurate with the other aspects of process operations.

5.1.4 First Line Supervision. The First Line Supervision implements safety related responsibilities that are delegated by upper management and has further responsibilities to:

5.1.4.1 Responsibility. Accept responsibility for the nuclear criticality safety of operations under their control.[1]

5.1.4.2 Training. Be knowledgeable in those aspects of nuclear criticality safety relevant to operations under their control as required by corporation/company training procedures for compliance with the applicable document in section 2.3.1.12.[2]

5.1.4.3 Provision of training. Ensure that nuclear criticality safety training is provided to personnel under their control in accordance with corporation/company training procedures for compliance with the applicable document in section 2.3.1.12 and require that these personnel have procedures and operating conditions necessary to perform their functions without undue risk. Records of training activities and verification of personnel understanding shall be maintained.[3]

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[1] ANSI/ANS-8.19-1984,R89, "Administrative Practices for Nuclear Criticality Safety," paragraph 5.1.

[2] ANSI/ANS-8.19-1984,R89, "Administrative Practices for Nuclear Criticality Safety," paragraph 5.2.

[3] ANSI/ANS-8.19-1984,R89, "Administrative Practices for Nuclear Criticality Safety," paragraph 5.3.

5.1.4.4 Procedural development. Develop, or participate in the development of, written procedures applicable to the operations under their control. Maintenance of these procedures to reflect changes in operation should be a continuing supervisory responsibility.[4]

5.1.4.5 Safety practices. Require conformance with good safety practices including unambiguous identification of fissionable materials and good housekeeping.[5]

5.1.4.6 Operational reviews. Review all proposed new operations, facility modifications, and process and equipment changes involving significant quantities of fissionable material or nuclear criticality safety. Verify compliance with nuclear criticality safety specification for new and modified equipment prior to its use.

5.1.4.7 Operational approvals. Ensure that all operations within the facility are approved by Line/Production Management based upon current nuclear criticality safety analyses and approvals as concurred by the Criticality Safety Organization.

5.1.4.8 Process monitoring. Monitor operations to verify compliance with nuclear criticality safety requirements.

5.1.4.9 Recovery and deviation evaluations. Evaluate all criticality safety specification or procedural limit violations and deviations, and concur with proposed recovery and corrective actions except for emergencies requiring immediate response.

5.1.4.10 Labeling and posting. Ensure that appropriate material labeling and area posting are maintained, specifying material identification and all operational/process limits on parameters that are subject to procedural control. Refer to section 2.1.8 for posting and labeling details. Posted operational and/or process limits are to be doable by fissionable material handlers.

5.1.4.11 Access control. Access to areas where fissionable material is handled, processed, or stored shall be controlled.

5.1.5 Fissionable Material Operations Personnel. All personnel working with fissionable material shall:

5.1.5.1 Responsibility. Be responsible for nuclear criticality safety of their own actions and the operating systems under their control.

5.1.5.2 Operational procedures. Conduct fissionable material operations in strict accordance with approved written procedures and instructions.

5.1.5.3 Terminate operations. In the event an unforeseen condition develops and a procedure does not correspond to the operating system, return operations to a known safe stopping point or stop performing the procedure and notify supervision.

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[4] ANSI/ANS-8.19-1984,R89, "Administrative Practices for Nuclear Criticality Safety," paragraph 5.4.

[5] ANSI/ANS-8.19-1984,R89, "Administrative Practices for Nuclear Criticality Safety," paragraph 5.6.

5.1.5.4 Inquiries. Ask supervision for additional training, guidance, instructions, or procedures when uncertain of the nuclear criticality safety of job tasks involving fissionable materials.

5.1.5.5 Training requirements. Complete and periodically update applicable nuclear criticality safety training in accordance with corporation/company procedures developed to comply with sections 5.1.3.4 and 5.1.4.2 of this standard.

5.1.5.6 Notification. Communicate information and concerns to co-workers and management as appropriate.

5.1.5.7 Emergency response. Know and follow emergency procedures.

5.1.6 Facilities Maintenance Organization. Through personnel NCS and facility access control training and use of a formal maintenance work permit program, the maintenance organization should ensure that nuclear criticality safety controls have been established prior to performing maintenance operations in facilities where fissionable material activities are conducted.

5.1.7 Engineering and Projects Organization (E&PO). The E&PO is responsible for the performance of oversight of design, procurement, and construction of facilities used for the processing, storage, or transport of fissionable material.

5.1.7.1 Responsibilities. E&PO should accept responsibilities in the area of nuclear criticality safety as delegated by the corporation/company President through corporation/company policies, procedures, and practices for nuclear criticality safety design control.

5.1.7.2 Design requirement compliance. In addition to those design responsibilities identified in section 5.1.7.1, E&PO should comply with the nuclear criticality safety design requirements contained in DOE Order 6430.1A and shall comply with the nuclear criticality safety requirements contained in DOE Order 420.1, Section 4.3 and the ANSI/ANS Standards referenced within DOE Order 420.1, Section 4.3.

5.1.8 Criticality Safety Organization (CSO). The installation CSO should:

5.1.8.1 Responsibility. Accept and implement nuclear criticality safety responsibilities as delegated by the corporation/company President and as described in corporation/company policies and procedures required by DOE Orders. This responsibility extends to the documentation of the nuclear criticality safety program to include policies and procedures implementing the elements of the ANSI/ANS standards specified in DOE Order 420.1, Section 4.3.

a. ANSI/ANS-8.1-1983,R88, "Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors," except paragraphs 4.2.2 and 4.2.3, and paragraph 3.3;

b. ANSI/ANS-8.3-1986, "Criticality Accident Alarm System," except paragraphs 4.1.2, 4.2.1, and 4.2;

c. ANSI/ANS-8.5-1986, "Use of Borosilicate-Glass Raschig Rings as a Neutron Absorber in Solutions of Fissile Materials";

d. ANSI/ANS-8.6-1983,R88, "Safety in Conducting Subcritical Neutron-Multiplication Measurements in Situ," except paragraph 5.3;

e. ANSI/ANS-8.7-1975,R87, "Guide for Nuclear Criticality Safety in the Storage of Fissile Materials," except paragraph 5.2;

f. ANSI/ANS-8.9-1987, "Nuclear Criticality Safety Criteria for Steel-Pipe Intersections Containing Aqueous Solutions of Fissile Materials";

g. ANSI/ANS-8.10-1983,R88, "Criteria for Nuclear Criticality Safety Controls in Operations with Shielding and Confinement";

h. ANSI/ANS-8.12-1987,R93, "Nuclear Criticality Control and Safety of Plutonium-Uranium Fuel Mixtures Outside Reactors";

i. ANSI/ANS-8.15-1981,R87, "Nuclear Criticality Control of Special Actinide Elements";

j. ANSI/ANS-8.17-1984,R89, "Criticality Safety Criteria for the Handling, Storage, and Transportation of LWR Fuel Outside Reactors," except paragraph 4.3;

k. ANSI/ANS-8.19-1984,R89, "Administrative Practices for Nuclear Criticality Safety";

l. ANSI/ANS-8.21-1995, "Use of Fixed Neutron Absorbers in Nuclear Facilities Outside Reactors."

5.1.8.2 Quality assurance. Maintain an organizational quality assurance plan and related procedures to ensure that accurate nuclear criticality safety analyses for intended fissionable material operations are performed and documented and any identified required controls are implemented for those operations. The quality assurance program should be consistent with the requirements of section 2.1.17.

5.1.8.3 CSO personnel qualifications. Establish criteria (see section 5.2.2) for qualifying CSO staff and qualify and periodically ensure the qualifications of staff performing or reviewing topics such as

(a) analyses of fissionable material process NCS event/fault-trees,

(b) evaluations of NCS control effectiveness,

(c) NCS evaluations,

(d) NCS analyses,

(e) analyses of nuclear criticality accident alarm/detection system placement,

(f) evaluations of nuclear criticality accident evacuation zones,

(g) audits of fissionable material processes and violation/procedural reviews,

(h) quality and configuration control of software and data sets used for NCS evaluations and for nuclear criticality accident alarm or detection system placement and evacuation zone evaluations,

(i) accident or unusual occurrence investigations or root cause analyses, and

(j) training for criticality safety.

5.1.8.4 Maintenance of familiarity. Maintain familiarity with

(a) current and developing nuclear criticality safety standards and guides,

(b) nuclear criticality safety computational codes to the extent that personnel need to use or interpret the codes or their results, and

(c) all operations within the corporation/company installation that require nuclear criticality safety controls. Familiarity may be gained through a combination of reading, tours, training, inspections, calculations, and periodic assignments to a facility as appropriate.

5.1.8.5 Consultation. Provide consultation and technical guidance by

a. advising corporation/company management of requirements relating to nuclear criticality safety and determining if the nuclear criticality safety program is consistent with this standard,

b. assisting in the development, review, and concurrence of operating procedures, and procedure changes affecting nuclear criticality safety,

c. assisting and advising in equipment and process design, review, and concurrence in process and equipment changes affecting nuclear criticality safety, particularly passive engineered controls and active engineered controls,

d. concurring in the approval of corporation/company-wide nuclear criticality safety related policies, procedures, manuals, and instructions written for conformance to regulations issued by organizations such as the U.S. Department of Energy (DOE), U.S. Department of Transportation (DOT), U.S. Nuclear Regulatory Commission (NRC) and the U.S. Code of Federal Regulations (CFR),

e. assisting with formal nuclear criticality safety related communications between the corporation/company and external organizations such as in requests for exemptions or non-adherences to DOE Orders or other regulations,

f. assisting in the development and execution of nuclear criticality safety training programs, and

g. assisting in evaluation of unusual/accident occurrences.

5.1.8.6 Obtaining consultation. Obtain consultation with knowledgeable individuals to obtain technical assistance as needed.

5.1.8.7 Performing self-assessments and audits. Conduct or participate in installation self-assessments or audits (at least annually) of nuclear criticality safety practices and compliance with procedures to ascertain that procedures are being followed and that process conditions have not been altered so as to affect the nuclear criticality safety of operations and the relevance of nuclear criticality safety analyses to the operations.

5.1.8.8 Operational reviews. Perform quarterly walk-through inspections of facilities in their areas of responsibility having the potential for a criticality accident. This walk-through may be done in conjunction with other facility audits, if implemented, and should include consideration of nuclear criticality safety practices and compliance with procedures. The frequency of such walk-throughs should be increased in relation to the potential for criticality accidents, degree of controls required, and level of activity ongoing, and should be specified by facility-, site-, or installation-specific procedure or policy documents.

5.1.8.9 Procedural reviews. Review new or revised procedures affecting nuclear criticality safety.

5.1.8.10 Incident reviews. Review installation operating or procedural NCS incidents for root causes, possible improvement of safety practices, and procedural requirements; report findings to management. (See 2.1.14.)

5.1.8.11 Process event/fault tree analyses. Review and concur in, or, as trained, qualified, and requested by management, provide fissionable material process event/fault tree analyses in support of, Safety Analysis Reports and nuclear criticality safety evaluations and analyses.

5.1.8.12 Quality and configuration control of software and data sets. Provide for software and data set verification, validation, and configuration control for criticality and radiation shielding computational methods used in nuclear criticality safety evaluations and, as applicable, for nuclear criticality accident alarm and detection system (CAS and CDS) placement evaluations.

5.1.8.13 NCS evaluations. Use quality controlled, configuration controlled, verified, and validated software and data sets; handbook techniques and data shown to be valid; or direct comparisons with critical and subcritical experiment data. Perform nuclear criticality safety evaluations to demonstrate technically the subcriticality of fissionable material processes, operations, and situations for transportation and storage under normal and credible abnormal conditions. Before starting a new operation with fissionable materials or before an existing fissionable material operation is changed, an evaluation shall be performed to determine that the entire process will be subcritical under both normal and credible abnormal conditions.[6] The evaluation shall

a. be documented with sufficient detail, clarity, and lack of ambiguity to allow independent evaluation and judgment of results[7], and

b. explicitly identify the controlled nuclear and process parameters and their associated limits upon which nuclear criticality safety depends.

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[6]ANSI/ANS-8.1-1983,R88, "Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors," paragraph 4.1.2.

[7]ANSI/ANS-8.1-1983,R88, "Nuclear Criticality Safety in Operations with Fissionable Materials Outside Reactors," paragraph 4.3.6 (1).

In an emergency or otherwise in the interest of safety, the evaluation and its documentation may be performed in whole or in part after the fact. The documentation shall also include a justification for performing recovery actions prior to completing the normal evaluation process described above.

5.1.8.14 NCS analyses. Using results of a structured analysis process (e.g., process event/fault tree, HAZOP, what-if, human reliability, failure modes and effects, MORT) and NCS evaluations, perform and document nuclear criticality safety analyses for proposed new or modified fissionable material processes as requested by facility line/production management. The safety analyses shall contain information to demonstrate compliance with applicable requirements for the prevention of inadvertent criticality and mitigation of consequences from a criticality accident. These safety analyses may be one or more documents and are not necessarily a special or separate nuclear criticality safety analysis package. When these analyses are used as input to the safety analysis report (SAR) they should be summarized. In addition, they should contain information assessing the risk for postulated criticality accidents. This will also provide a basis for unreviewed safety question (USQ) determination. Preparation of the NCS analysis is to include

a. the controlled nuclear and process parameters and their associated limits, resulting from the bounding NCS evaluation and analysis, upon which nuclear criticality safety depends,

b. the identification and evaluation (or statement of engineering judgment basis) of assumed process or nuclear parameter control effectiveness,

c. required internal reviews and authorizations or approvals, and

d. a needs analysis for a CASs, CDSs, and NADs.

In the event of a TSR violation (e.g., violation of the double-contingency principle) or discovery that the basis for criticality safety is invalid, a NCS analysis shall be made prior to recovering from the event or discovered condition. However, in an emergency or otherwise in the interest of safety, the analysis and its documentation may be performed in whole or in part after the fact. The documentation shall also include a justification for performing recovery actions prior to completing the normal analysis process described above.

5.1.8.15 NCS recovery actions. Respond to, and assist in, recovering from contingencies and any other discoveries that the basis for criticality safety is invalid by supplying advice and commenting on proposed actions in addition to performing and documenting NCS evaluations and analyses as described above. Initial advice should focus on whether it is necessary to declare an emergency, and if so, how to deal with the emergency. Generally, loss of all protection against criticality constitutes an emergency; exceptions include instances where shielding protects workers and equipment vital to safety against the dose consequences of a criticality accident. If the situation does not warrant declaring an emergency, advice should first focus on immediate or near term vulnerabilities that, if left uncorrected, could lead to declaring an emergency.

5.1.8.16 CAS and CDS sensors, NAD, and evacuation zone boundary shielding and deployment evaluation. Participate in the performance of evaluations for placement of CASs and CDSs sensors, NADs, and evacuation zone boundaries for credible nuclear criticality accident source terms using appropriate criticality and shielding codes as necessary, providing a peer review of results, documenting the results, and maintaining records of the evaluation.

5.1.8.17 Peer review. Provide peer reviews of

(a) fissionable material process analyses affecting NCS,

(b) NCS evaluations,

(c) NCS analyses,

(d) CAS, CDS, and NAD deployment evaluations,

(e) nuclear criticality accident evacuation zone evaluations, and

(f) quality and configuration control of software and data sets used for NCS evaluations and nuclear criticality accident alarm or detection system placement and evacuation zone evaluations.

5.1.8.18 Records retention. Ensure the maintenance of records during the period of their applicability and at least for periods specified in section 2.1.2 for

(a) NCS analyses,

(b) CAS, CDS, and NAD placement evaluations,

(c) nuclear criticality accident evacuation zone evaluations,

(d) fissionable material process audits and violation/procedural reviews, and

(e) quality and configuration control of software and data sets used for NCS evaluations and nuclear criticality accident alarm or detection system placement and evacuation zone evaluations.

5.1.8.19 NCS procedures. Prepare, maintain, and interpret policy, standards, guidelines, and implementation procedures for installation nuclear criticality safety requirements.

5.1.8.20 Design reviews. Provide independent safety reviews of documents significant to criticality safety for all new facilities and significant modifications that affect nuclear criticality safety in existing facilities. Documents include training plans, design criteria, project design documentation, technical specifications, procedures, and drawings.

5.1.8.21 Selection of effective controls. With support from first line supervision, effectively select controls for nuclear criticality safety as identified by the nuclear criticality safety analysis.

5.1.8.22 Assistance in shutdowns. Technically assist line supervision in safely suspending fissionable material operations that, in the judgment of line supervision or the CSO, do not have the required level of nuclear criticality safety.

5.1.8.23 Accident yield estimation. Provide for the evaluation of yield of credible nuclear criticality accidents bounding facility or installation fissionable material processes.

5.1.8.24 Technical training support. Review, approve, and provide technical information, as requested, for general and facility-specific nuclear criticality safety training curricula.

5.1.8.25 Reviews of fire safety plans. Review and concur in the fire safety plan for each facility having significant quantities of fissionable materials.

5.1.8.26 Operational experience feedback. Examine reports of procedural violations and other deficiencies for potential improvements of safety practices and procedural requirements, and report such potential improvements to management. Collect, analyze, and examine for trends of operational experiences relating to criticality safety to determine if the assumptions in NCS evaluations and analyses are valid, too conservative, or otherwise need revising. Report priority needs for revisions to management.

5.1.8.27 INCSRC support. Provide nuclear criticality safety experienced personnel to serve on, and assist, the Installation Nuclear Criticality Safety Review Committee, as requested.

5.1.9 Installation Nuclear Criticality Safety Review Committee (INCSRC). The INCSRC should be provided as a liaison between the installation site manager and the installation operating and nuclear criticality safety organizations.

5.1.9.1 Composition. Should be chaired by an individual who reports to the Installation Manager or a sufficiently high level of management and be independent of fissionable material Operations and the Nuclear Criticality Safety Organization. Membership to the committee should include individuals representing the installation for

(a) fissionable material operations and waste management,

(b) fissionable material operations development and engineering,

(c) fissionable material accountability and security,

(d) emergency preparedness,

(e) installation maintenance and support, and

(f) Criticality Safety Organization.

5.1.9.2 Guidance to management. Provide guidance to management for principles and policy of the installation nuclear criticality safety program including the resolution of any conflicting interpretations of NCS policies and procedures.

5.1.9.3 Investigation of incidents. Direct and participate in the investigation of criticality safety incidents that are classed as "violations," in accordance with the reference in 2.1.3. (See also 2.1.14.)

5.1.9.4 INCSRC Annual reviews. INCSRC, or a designated review team, should conduct annual reviews of the Installation NCS program. These reviews should include applicable items from the following elements:

a. Presentations by the installation NCS Organization regarding the status of
   (1) any proposed nuclear criticality safety program policy changes;
   (2) activities of the NCS Organization with respect to
      (i) pertinent aspects of continuing facility operations and of major new programs or modifications,
      (ii) applicable audit recommendations and suggestions resulting from audits of the nuclear criticality safety program,
      (iii) participation in installation personnel education and training efforts, and
      (iv) development, training, and qualification of NCS personnel;
   (3) compliance with DOE Orders and other federal, state, or municipal regulations regarding NCS as evidenced by documented periodic reviews and random surveillances; and
   (4) configuration control program for the conduct of CSO operations.

b. Presentations by operating line management responsible for, or affecting, the installation NCS program regarding
   (1) inspections, audits, and self-assessments including follow-up on corrective actions and recommendations from incident investigations,
   (2) personnel training, qualification, and certification,
   (3) administration of nuclear criticality safety controls including methods, accomplishments, and procedures,
   (4) installation and facility access control,
   (5) process and facility engineering design development, construction, and maintenance activities,
   (6) configuration control of processes, equipment, and facilities important to NCS,
   (7) ancillary support equipment and utilities affecting fissionable material operations, storage, or transportation,
   (8) operations, storage, and transportation of fissionable materials,
   (9) emergency preparedness and drills, and
   (10) compliance with statutory requirements regarding NCS as evidenced by documented self appraisals.

c. A physical inspection of the fissionable material control areas for the purpose of focusing on specific program review topics.

d. Reviews of installation and facility operating experiences, including operating anomalies and NCS incidents along with incident investigation and prior review responses and follow-up by line management and the NCS organization.

e. Review of criticality accident alarm and detection systems performance.

f. The documentation of the annual review in a report provided to the Installation Manager that contains the items of review, findings, and recommendations.

g. A summary presentation of the annual review report to the Installation Manager.

5.1.9.5 Response to requests. Review on an as-needed or requested basis

(a) any proposed criticality safety program policy change, making recommendations to management, and

(b) any issues or concerns that should properly come before the INCSRC.